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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/650,258	08/27/2003	Han-Ping Pu	6319-66761	7182

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EXAMINER

NGUYEN, DILINH P

ART UNIT PAPER NUMBER

2814

DATE MAILED: 05/04/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

HA

Office Action Summary	Application No.	Applicant(s)	
	10/650,258	PU HAN-PING	
	Examiner	Art Unit	
	DiLinh Nguyen	2814	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 April 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 12-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 12-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>1/7/04</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 12-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over AAPA (fig. 1a) (newly cited) in view of Huang (U.S. Pat. 6507121) (newly cited).

AAPA discloses a semiconductor device comprising:

a device carrier 101 including a metal surface 82;

at least a semiconductor unit 21 including at least an electrode; and

at least an interconnection portion 31.

AAPA fails to disclose the interconnection portion including a first part and a second part (fig. 1a).

However, Huang disclose an electronic package comprising:

an interconnection portion including a first part 218 and a second part 220, wherein the second part directly contacts the metal surface 204 and the element 206, both the first part and the second part span between and tie together the metal surface 204 and the element 206, the second part is wrapped by the first part, the first part has a melting point lower than that of the second part, and the first part adheres to the second part (cover fig., column 3, lines 25-35). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the

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device of AAPA by having the interconnection portion including a first part and a second part; wherein the first part has a melting point lower than that of the second part, as taught by Huang, in order to control the collapse for the semiconductor package and the solder ball can be prevented from being short (column 3, lines 47-57).

- Regarding claim 13, AAPA discloses that the interconnection portion 31 electrically connects the metal surface 82 and the semiconductor unit 21 (fig. 1a).
- Regarding claim 14, AAPA discloses that the interconnection portion 31 mechanically connects the device carrier 101 and the semiconductor unit 21 (fig. 1a).
- Regarding claim 15, Huang discloses that the first part 218 contains more tin than lead, while the second part contains more lead than tin (cover fig., column 3, lines 25-35).
- Regarding claims 16-17, AAPA discloses that the device carrier 101 is a lead frame enclosed by the metal surface 82 (fig. 1a).
- Regarding claim 18, Huang discloses that the second part 220 is sealed by the first part 218, the substrate 204 and the element 206 (cover fig.).
- Regarding claim 19, Huang discloses that the first part contains materials by which the solder wettability between the first part and the second part is controlled by the second part (cover fig., column 3, lines 44-46).

3. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over AAPA (fig. 1) in view of Huang (U.S. Pat. 6,507,121) (newly cited) and further in view of Grigg (U.S. Pat. 6,506,671) (previously applied).

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AAPA and Huang substantially disclose all the limitations as claimed above except for the first part has an end contacting the electrode of the semiconductor unit and partially contacts an area which is part of the semiconductor unit and which surround the electrode of the semiconductor unit.

However, Grigg (cover fig., column 6, lines 19-25) discloses an interconnection portion including a first part 50' and second part 20', wherein the first part has an end partially contacting an electrode 12 of a semiconductor unit 10 and partially contacting an area which is part of the semiconductor unit and which surrounds the electrode of the semiconductor unit (cover fig., column 6, lines 19-25). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the device structure of the above combination by having the first part partially contacts an area which is part of the semiconductor unit, as taught by Gigg, such the contact area would prevent contamination of the passivation layer surrounding the contact pads and reduce the occurrence of solder fatigue (cover fig., column 4, lines 10-20).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DiLinh Nguyen whose telephone number is (571) 272-1712. The examiner can normally be reached on 8:00AM - 6:00PM (M-F).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy can be reached on (571) 272-1705. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

DLN



HOAI PHAM
PRIMARY EXAMINER